

The Listing of Claims will replace all prior versions, and listings, of claims in the application.

Claims 1 - 5 (Canceled)

Claim 6. (Currently Amended) A method for the preparation of biocompatible phase-pure crystalline magnesium-substituted hydroxyapatite comprising mechanochemically comminuting and dissolving while hydrothermally reacting without external heating a source of calcium ions, a source of magnesium ions, a source of phosphate ions and a source of hydroxide ions, at least one of which is soluble in water, in a aqueous reaction medium until said magnesium substituted-hydroxyapatite is formed, wherein at least one ~~ion of said~~ source of calcium ions, source of magnesium ions, source of phosphate ions and source of hydroxide ions is water-insoluble or forms a water-insoluble apatite precursor, and said ion sources are stoichiometrically selected to provide a level of magnesium substitution in the hydroxyapatite lattice structure between about 2.0 and about 29 wt%.

Claim 7. (Canceled)

Claim 8. (Original) The method of Claim 6, further comprising the step of separating said magnesium-substituted hydroxyapatite from said aqueous reaction medium.

Claim 9. (Original) The method of Claim 8, further comprising the step of washing said magnesium-substituted hydroxyapatite with water.

Claim 10. (Original) The method of Claim 9, further comprising the step of drying said magnesium-substituted hydroxyapatite.

Claim 11. (Original) The method of Claim 9, further comprising the step of washing said magnesium-substituted hydroxyapatite with an aqueous ammonium citrate solution before washing said magnesium-substituted hydroxyapatite with water.

Claim 12. (Canceled).

Claim 13. (Currently Amended) The method of Claim 6, wherein the calcium ion source or the magnesium ion source is water-insoluble.

Claim 14. (Original) The method of Claim 6, wherein said phosphate ion source is water soluble.

Claim 15. (Original) The method of Claim 6, wherein said magnesium ion source is selected from the group consisting of magnesium hydroxide, magnesium carbonate, magnesium halides, magnesium oxide, magnesium nitrate and magnesium phosphate.

Claim 16. (Original) The method of Claim 15, wherein said magnesium ion source is magnesium hydroxide.

Claim 17. (Original) The method of Claim 6, wherein said calcium ion source is selected from the group consisting of calcium hydroxide, calcium carbonate, calcium halides, calcium oxide, calcium nitrate and calcium phosphate.

Claim 18. (Original) The method of Claim 17, wherein said calcium ion source is calcium hydroxide.

Claim 19. (Original) The method of Claim 6, wherein said phosphate ion source is selected from the group consisting of ammonium phosphates, calcium phosphates, magnesium phosphates, and sodium phosphates.

Claim 20. (Original) The method of Claim 19, wherein said phosphate ion source is diammonium hydrogen phosphate.

Claims 21 - 28. (Canceled)

Claim 29. (Currently Amended) A method for increasing the magnesium content in the lattice structure of magnesium-substituted crystalline hydroxyapatite relative to the ~~calcium content of the lattice structure and to the~~ non-lattice magnesium content, said method comprising washing said magnesium-substituted hydroxyapatite with an aqueous ammonium citrate solution.

Claim 30. (Canceled)